WHAT IS CLAIMED IS:

1. A method of creating and displaying images resulting from digital tomosynthesis performed on a subject using a flat panel detector comprising the steps of:

acquiring a series of x-ray images of the subject, the x-ray images being acquired at two or more different angles relative to the subject;

applying a first set of corrective measures to the series of images;

reconstructing the series of images into a series of at least one slice through the subject;

applying a second set of corrective measures to the slice; and

displaying the images or slice according to at least one of a plurality of display options.

2. The method of claim 1, wherein the first set of corrective measures includes at least one of detector correction, intensity correction, scatter correction, geometric correction, motion correction, material decomposition, noise reduction, and filtration.

3. The method of claim 1, wherein the second set of corrective measures includes at least one of filtering, motion correction, noise reduction, presentation processing, and material decomposition.

4. The method of claim 1, wherein the display options allow for at least one of a selection of the region of interest, segmentation, formatting of the images, rendering and creation of a three-dimensional display, and creation of a two-dimensional display.

5. The method of claim 4, wherein the step of displaying the images or slice according to at least one of a plurality of display options comprises the step of displaying one or more of the images in a two-dimensional display.

6. The method of claim 4, wherein the step of displaying the images or slice according to at least one of a plurality of display options comprises the step of displaying one or more of the images in a three-dimensional display.

7. The method of claim 1, further comprising the step of applying computer assisted processing and diagnosis algorithms to data represented by the images or slice.

8. The method of claim 1, further comprising the step of archiving data represented by the images or slice.

9. The method of claim 1, wherein the step of acquiring a series of x-ray images of the subject is performed before the step of reconstructing the series of images into a series of at least one slice through the subject.

10. The method of claim 1, wherein the step of acquiring a series of x-ray images further comprises the steps of:

receiving inputs relating to options for acquiring x-ray images of the subject, the options allowing for the selection of at least one of a field of view, a method of controlling the dose of the x-rays, an energy level or levels at which the images will be acquired, how a source and a detector will move while the images are acquired, whether a large field of view is desired, acquisition paths of the source and the detector, and characteristics of the slice to be constructed from the x-ray images;

acquiring a single x-ray image of the subject;

adjusting parameters related to the acquisition of x-ray images, the parameters including at least one of x-ray technique parameters, filtration techniques, position of acquisition, and angle of the acquisition; and

continuing to acquire a single x-ray image and to then adjust the acquisition parameters until a sufficient number of images have been acquired.

11. The method of claim 10, wherein at least one of the parameters related to the acquisition of the x-ray images is adjusted based on information provided by a previously acquired image.

12. The method of claim 10, wherein the step of acquiring a series of x-ray images further comprises the steps of:

acquiring an initial x-ray image to of the subject; and

detecting at least one physiological signal from the subject and using the physiological signal as a basis for one of triggering the acquisition of subsequent x-ray images and processing the x-ray images after they have been acquired.

13. The method of claim 1, wherein the step of reconstructing the series of images into a series of at least one slice through the subject further comprises the step of applying a reconstruction algorithm to the data represented by the series of x-ray images, the reconstruction of the at least one slice being optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition.

14. The method of claim 13, wherein the step of reconstructing the series of images into a series of at least one slice through the subject further comprises the step of applying a deconvolution algorithm to at least one slice, the application of the deconvolution algorithm being optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition.

15. A system for creating and displaying images of the internal structures of a subject resulting from digital tomosynthesis performed with a flat panel digital detector comprising:

a means for acquiring a series of x-ray images of the subject, the x-ray images being acquired at two or more different angles relative to the subject;

a means for applying a first set of corrective measures to the series of images;

a means for reconstructing the series of images into a series of at least one slice through the subject;

a means for applying a second set of corrective measures to the slice; and

a means for displaying the images or slice according to at least one of a plurality of display options.

16. The system of claim 15, wherein the first set of corrective measures includes at least one of detector correction, intensity correction, scatter correction, geometric correction, motion correction, material decomposition, noise reduction, and filtration.

17. The system of claim 15, wherein the first set of corrective measures includes at least one of detector correction, intensity correction, scatter correction, geometric correction, motion correction, material decomposition, noise reduction, and filtration.

18. The system of claim 15, wherein the second set of corrective measures includes at least one of filtering, motion correction, noise reduction, presentation processing, and material decomposition.

19. The system of claim 15, wherein the display options allow for at least one of a selection of the region of interest, segmentation, formatting of the images, rendering and creation of a three-dimensional display, and creation of a two-dimensional display.

20. The system of claim 15, further comprising the step of applying computer assisted processing and diagnosis algorithms to data represented by the images or slice.

21. The system of claim 15, further comprising the step of archiving data represented by the images or slice.

22. A method of creating and displaying images of the anatomy of a patient using digital tomosynthesis performed with a flat panel detector and other equipment comprising the steps of:

receiving inputs relating to options for acquiring x-ray images of the patient, the options allowing for the selection of at least one of a field of view, a method of controlling the dose of the x-rays, an energy level or levels at which the

images will be acquired, how a source and a detector will move while the images are acquired, whether a large field of view is desired, acquisition paths of the source and the detector, and characteristics of at least one slice to be constructed from the x-ray images;

acquiring a single x-ray image of the patient;

adjusting parameters related to the acquisition of x-ray images, the parameters including at least one of x-ray technique parameters, filtration techniques, position of acquisition, and angle of the acquisition;

continuing to acquire a single x-ray image and to then adjust the acquisition parameters until a sufficient number of images have been acquired;

applying detector corrections to one or more of the images;

applying intensity corrections to one or more of the images;

applying geometric corrections to one or more of the images;

performing at least one of frequency filtering for structure enhancement, tissue equalization, spatial filtering, and image resizing on one or more of the acquired images;

reconstructing at least one slice through the patient by applying a reconstruction algorithm to the data represented by the acquired images;

removing artifacts from the slice and enhancing information provided in the slice;

optimizing the display of the slice by performing at least one of edge enhancement, tissue equalization, display window level adjustment, and display window width adjustment; and

displaying the slice as one of a two-dimensional or three-dimensional image or set of images.

23. The method of claim 22, further comprising the step of acquiring an initial x-ray image, the initial x-ray image providing information about the patient.

24. The method of claim 23, wherein at least one of the parameters related to the acquisition of x-ray images is adjusted based on information provided by the initial x-ray image.

25. The method of claim 22, wherein at least one of the parameters related to the acquisition of x-ray images is adjusted based on information provided by a previously acquired image.

26. The method of claim 22, further comprising the step of detecting at least one physiological signal from the patient and using the signal as a basis for one of triggering the acquisition of subsequent x-ray images and processing the x-ray images after they have been acquired.

27. The method of claim 22, further comprising the step of applying scatter corrections to at least one of the images.

28. The method of claim 22, further comprising the step of applying corrections to at least one of the images to account for motion of the patient that takes place between the acquisitions of the images.

29. The method of claim 22, further comprising the step of applying material decomposition techniques to at least one of the images.

30. The method of claim 22, wherein the step of reconstructing at least one slice through the patient by applying a reconstruction algorithm to data represented by the acquired images is optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition.

31. The method of claim 22, further comprising the step of applying a deconvolution algorithm to the slice, the application of the deconvolution algorithm being optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition.

32. The method of claim 22, further comprising the step of removing motion artifacts from the slice.

33. The method of claim 22, further comprising the step of applying noise reduction algorithms to the slice.

34. The method of claim 22, further comprising the step of performing material decomposition on the slice.

35. A method of creating and displaying images of the anatomy of a patient using digital tomosynthesis performed with a flat panel digital detector and other equipment comprising the steps of:

acquiring an initial x-ray image, the initial x-ray image providing information about the patient;

receiving inputs relating to options for acquiring additional x-ray images of the patient, the options allowing for the selection of at least one of a field of view, a method of controlling the dose of the x-rays, an energy level or levels at which the images will be acquired, how a source and a detector will move while the images are acquired, whether a large field of view is desired, acquisition paths of the source and the detector, and characteristics of at least one slice to be constructed from the x-ray images;

detecting at least one physiological signal from the patient and using the physiological signal as a basis for one of triggering the acquisition of subsequent x-ray images and processing the x-ray images after they have been acquired;

acquiring a single x-ray image of the patient;

adjusting parameters related to the acquisition of x-ray images, the parameters including at least one of x-ray technique parameters, filtration techniques, position of acquisition, and angle of the acquisition;

acquiring another x-ray image of the patient according to the adjusted parameters related to the acquisition of x-ray images;

continuing to adjust the acquisition parameters and to acquire additional x-ray images until a sufficient number of images have been acquired;

applying detector corrections to at least one of the images;

applying intensity corrections to at least one of the images;

applying scatter corrections to at least one of the images;

applying geometric corrections to at least one of the images;

applying corrections to at least one of the images to account for motion of the patient that takes place between the acquisitions of the images;

applying material decomposition techniques to at least one of the images;

performing at least one of frequency filtering for structure enhancement, tissue equalization, spatial filtering, and image resizing on one or more of the acquired images;

reconstructing at least one slice through the patient by applying a reconstruction algorithm to the data represented by the acquired images, the reconstruction of the slices being optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition;

applying a deconvolution algorithm to the slice, the application of the deconvolution algorithm being optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition;

removing from the slice artifacts that resulted from the reconstruction of the slice and enhancing information provided in the slice;

removing motion artifacts from the slice;

applying noise reduction algorithms to the slice;

optimizing the display of the slice by performing at least one of edge enhancement, tissue equalization, display window level adjustment, and display window width adjustment;

performing material decomposition on the slice; and

displaying at least one of the images or slice based upon selected display options, the display options allowing for at least one of a selection of a region of interest, segmentation, reformatting and remapping of the data represented by the images or slice, rendering, creation of a two-dimensional display, and creation of a three-dimensional visualization based on a rendered set of data represented by the images and slice.

36. The method of claim 35, further comprising the step of applying computer aided processing and diagnosis algorithms to the data represented by at least one of the images or slice.

37. The method of claim 36, further comprising the step of archiving at least one of an image, a slice, and data represented by the image and slice.

38. The method of claim 35, wherein the step of acquiring a single x-ray image of the patient is performed before the step of reconstructing at least one slice through the patient using a reconstruction algorithm.

39. The method of claim 35, wherein the data represented by the acquired images to which the reconstruction algorithm is applied during the step of reconstructing at least one slice through the patient does not include the data represented by the initial x-ray image.

40. The method of claim 35, wherein the noise reduction algorithms are applied to each slice independently.

41. The method of claim 35, wherein the noise reduction algorithms are applied across the slices.

42. The method of claim 35, wherein at least one of the parameters related to the acquisition of x-ray images is adjusted based on information provided by the initial x-ray image.

43. The method of claim 35, wherein at least one of the parameters related to the acquisition of x-ray images is adjusted based on information provided by a previously acquired image.

44. A method of adjusting the acquisition parameters for the acquisition of images during tomosynthesis performed on a subject comprising the steps of:

acquiring a first image of the subject, the first image providing information relating to the subject;

selecting the acquisition parameters for the acquisition of a second image based on the information provided by the first image; and

acquiring a second image according to the selected acquisition parameters.

45. The method of claim 44, wherein the acquisition parameters include at least one of energy level, pulse duration, tube current, and tube current duration.

46. The method of claim 44, wherein the information provided by the first image includes information relating to at least one of the thickness of the subject, internal structures of the subject, the location of the internal structures of the subject, and the identification of the internal structures of the subject.

47. The method of claim 44, further comprising the step of continuing to acquire a first image of the subject, to select the acquisition parameters for the acquisition of a second image based on the information provided by the first image, and to acquire a second image according to the selected acquisition parameters until a sufficient number images have been acquired.

48. The method of claim 44, wherein the first image is a pre-tomosynthesis image.

49. A method of creating and displaying images resulting from digital tomosynthesis performed on a subject using a flat panel detector comprising the steps of:

acquiring a series of x-ray images of the subject, the x-ray images being acquired at two or more different angles relative to the subject;

applying a set of corrective measures to the series of images;

reconstructing the series of images into a series of at least one slice through the subject; and

displaying the images or slice according to at least one of a plurality of display options.

50. The method of claim 49, wherein the first set of corrective measures includes at least one of detector correction, intensity correction, scatter correction, geometric correction, motion correction, material decomposition, noise reduction, and filtration.

51. The method of claim 50, wherein the step of reconstructing the series of images into a series of at least one slice through the subject further comprises the step of applying a reconstruction algorithm to the data represented by the series of x-ray images, the reconstruction of the at least one slice being optionally based on historical information relating to at least one of the physical condition of the subject , the pathological condition of the subject, and the acquisition parameters of at least one previous acquisition.

52. The method of claim 51, wherein the display options allow for at least one of a selection of the region of interest, segmentation, formatting of the images, rendering and creation of a three-dimensional display, and creation of a two-dimensional display.

53. The method of claim 52, wherein the step of acquiring a series of x-ray images further comprises the step of adjusting parameters related to the acquisition of x-ray images between the acquisitions of the x-ray images, the parameters including at least one of x-ray technique parameters, filtration techniques, position of acquisition, and angle of the acquisition.

54. The method of claim 53, wherein at least one of the parameters related to the acquisition of the x-ray images is adjusted based on information provided by a previously acquired image.